

like a low-crowned black hat resting upon the water. The rocky part is only a few acres in extent and rises about 50 feet above the water level of 1933, which was near zero on the government gauge at Black Point. The island is surrounded by a submerged platform averaging perhaps a thousand feet in breadth. This is thickly encrusted with uneven calcareous tufa, which is apparently being built at the present time. Slimy masses of algae impart to the rounded crusts, or bioherms, a mottled greenish-brown color and are believed to be the causal agents in the formation of the tufa. Spaces between the bioherms are filled with light gray oölitic sand similar in composition to the crusts.⁴ At the 1933 stage of the lake the platform was covered with about 3 feet of water, but near the shore of the island was a moatlke depression about 6 feet deep and 100 to 200 feet wide, for which no satisfactory explanation has been suggested. In more normal years the water is 10 to 15 feet deeper. The circumstance reminds one of a coral reef enclosing a lagoon.

Trailing off to the southeast of the island is an embankment of sand and gravel, which was formed as a broad shoal when the lake level stood higher. It consists of wave-worn fragments of hard rock and tufa, mingled with the prevailing oölitic sand.

The rocky part of Hat Island is composed almost wholly of a tilloid conglomerate identical in character with that exposed in Little Mountain, west of Ogden.⁵ As in that

⁴ Similar deposits and bottom conditions have been well described by A. J. EARDLEY, as he found them on other parts of the Salt Lake shore. (*Sediments of Great Salt Lake, Utah*. Bull. Amer. Assoc. Petr. Geol. 22: 1305-1411. 1938.)

⁵ BLACKWELDER, ELIOT. *An ancient glacial formation in Utah*. Journ. Geol. 40: 291. 1932.

locality, the rock is typically a massive dark gray argillite, well sprinkled with pebbles and boulders, among which white and gray metaquartzites and pinkish gneiss predominate. The matrix has a rude but evident cleavage, which would warrant calling it a bouldery slate, but the boulders are undeformed. For reasons that have already been sufficiently set forth in the writer's earlier paper, the rock is regarded as probably glacial and is therefore here called *tillite*.

The massive and otherwise structureless tillite is interrupted by two or three beds, or lenses, of stratified graywacke and fine conglomerate 2 to 4 feet thick. These beds were almost certainly comprised of sand and gravel that were sorted and deposited by streams of water, seemingly similar to deposits commonly associated with till in Pleistocene moraines.

On Hat Island neither the bottom nor the top of the tillite is exposed, but the visible thickness is roughly estimated as about 200 feet. The banded or varved slates, which form a significant member of the sequence at the south end of Little Mountain, were not observed on Hat Island.

The beds of graywacke strike N. 20° W. and dip eastward about 30°, whereas in Little Mountain the dip is westward. These relations suggest that the tillite of Hat Island may be the same formation as that in Little Mountain but reappearing on the western side of a broad syncline.

Nothing on Hat Island indicates the age of the tillite, but its similarity to other occurrences in the Salt Lake district suggests that the formation is late pre-Cambrian or possibly Lower Cambrian in age.

ZOOLOGY.—*Disoma franciscanum*, a new marine annelid from California.¹ OLGA HARTMAN, University of Southern California. (Communicated by WALDO L. SCHMITT.)

Numerous collections of an unknown member of the Disomidae, dredged by the U. S. Fisheries steamer *Albatross* during 1912 and 1913, form the basis of this report. The family is a small one, known through

only scattered references from widely spaced geographic regions. Occurrence of its representatives, even in large collections, is extremely rare. The family is known for only eight (or not over ten) species. The genera, *Disoma* Oersted and *Pocillochaetus* Claparède, are usually the only ones recog-

¹ Received February 18, 1947. The illustrations for this paper were made by Anker Petersen.

nized, but the status of some other names remains enigmatical.

The family name, Disomidae, was erected by Mesnil (1897). It includes Disomididae Chamberlin (1919, p. 370) and Disominae Söderström (1920, p. 271). *Disoma* Oersted (1844) is the oldest genus; it was later named *Trochochaetus* Levinsen (1882) based on a posterior fragment of what later proved to be the genotype of *Disoma*. A later addition, *Nevaya whiteavesi* McIntosh (1911, p. 149) was first placed among the Scalibregmidae, but later shown to be another species of *Disoma* (Fauvel, 1916, p. 3). *Disomides* Chamberlin (1919, p. 370) was proposed to replace *Disoma* Oersted, since the latter was thought to be preoccupied; the family name was thus changed to Disomididae Chamberlin. This change was not required.

Another name, *Thaumastoma* Webster and Benedict (1884), was also referred to *Disoma* by Mesnil (1897, p. 94), but to me this view seems in error. The original and only known description is either incorrect on characters that have major importance or else the individual on which the genus was based departs so widely from all known members of the family that it is hardly inclusive in this group. It was erected for a single species, *T. singulare* Webster and Benedict (1884, pp. 737-739), from Massachusetts. A single injured specimen measured 16 mm long for 22 segments (hence only an anterior fragment). Identity with *Disoma multisetosum* (Oersted) has been suggested (Mesnil, 1897), but this view may have been prompted by the presence of serrated parapodial lobes.

The following characters, based on the description, are at variance with those of *Disoma*: (1) Ventral setae of the first two segments were stated to be in two series, the one capillary, the other stout spines. In species of *Disoma* only the second neuropodium may have spines in addition to setae. (2) The first segment was said to have a median cirrus. (3) The second segment has notopodia provided with a fan of capillary setae, while in front is a thin projecting plate divided into six unequal lobes. When a serrated membrane is present, it is typically postsetal, not presetal, in position.

(4) Behind the second segment all setae are capillary; no mention is made of modified acicular spines. (5) In the third segment a digitate plate is said to extend down the side of the body, presetal in position. If the author confused presetal with postsetal positions, in the instances mentioned above, the relations to *Disoma* are clearer, but there are other discrepancies that are not to be explained. Since the only known specimen on which the description was based is not known to exist, it seems advisable to regard *Thaumastoma singulare* as an indeterminable genus and species.

The only other genus of the family, *Poecilochaetus* Claparède (1875) was erected for an aberrant larva for which the sedentary stages were later found. Levinsen (1882, p. 104) recognized the affinities of *Disoma* and *Poecilochaetus*, based on a study of the larval stages of their respective species, but it was not until later that the family Disomididae was recognized and its members separated from those of the family Spionidae (Mesnil, 1897).

The generic name *Poecilochaetus*, like that of *Disoma*, is also obscured by systematic complexities. Much earlier, *Cherussia nitens* Müller (1858, p. 217) from Brazil, was described. Both the genus and species remain enigmatical and unknown except through a brief, original record. However, two characters ally it to *Poecilochaetus*; they are (1) the structure of parapodia, in having foliaceous dorsal and ventral lobes, and (2) the prostomial caruncle which has a branched, median antenna. In other respects the account of *Cherussia* is very sketchy and obscure.

The conclusions regarding the family Disomididae may be summarized as follows: Two genera, *Disoma* and *Poecilochaetus* are recognized. The first includes *Trochochaetus* Levinsen, *Nevaya* McIntosh, and *Disomides* Chamberlin; the second includes questionably *Cherussia* Müller; *Thaumastoma* Webster and Benedict is indeterminable.

Poecilochaetus Claparède is known from the Americas through a single species, *P. johnsoni* Hartman (1939, p. 164) from California. *Disoma* Oersted is known from the Western Hemisphere through two species, both from deep water off eastern Canada:

D. carica Birula, recorded as *Nevaya whit-eavesi* McIntosh (see Fauvel, 1932, p. 24), and *D. watsoni* Fauvel (1932, p. 28). A third species, *D. franciscanum*, is described below.

The known species of *Disoma* may be approximately divided into two groups. In one the anterior, postsetal lobes are serrated. To this group belong the genotype, *D. multisetosum* Oersted (1844) known from north-western Europe, and *D. franciscanum*. In the second group the postsetal lobes are entire. To it belong *D. carica* Birula from northern Europe and eastern Canada, *D. orissae* Fauvel (1932, p. 174) from India, and *D. watsoni* Fauvel (1916, p. 3). The last three named are not clearly distinguishable from one another (Fauvel, 1932, p. 174), since the last two are known through only short, imperfect, anterior fragments.

KEY TO SPECIES OF DISOMA OERSTED

1. Postsetal lobes entire
 *carica* Birula, *orissae* Fauvel,
 and *watsoni* Fauvel
2. Postsetal lobes serrated in anterior segments.
2. Third parapodium with a long cirrus
 *multisetosum* Oersted
- Third parapodium without a long cirrus
 *franciscanum*, n. sp.

Disoma franciscanum, n. sp.

Figs. 1-3

Collections—San Francisco Bay, Calif., dredged by the *Albatross* during 1912 and 1913, from the following dredging stations (consult dredging and hydrographic records of the *Albatross*, 1911-1920: Appendix 3 to Rep. U.S. Comm. Fish. for 1920, Bur. Fish. Doc. No. 897, Washington, 1911, for more complete data). D5705 (2), D5706 (2), D5723 (1), D5729 (2), D5744 (1), D5754 (1), D5772 (1), D5828 (1), D5830 (18), D5831 (2), D5838 (many, with tubes). Depths range from 1 to 16 fathoms, bottom of mud and sand to shale.

Description.—Among the numerous individuals listed above, none is complete, but one may estimate the total, probable length from larger fragments. A longer piece, including anterior and median portions measures 60 mm long for 73 segments. Another piece, consisting of only posterior, biramous parapodia measures nearly as long. The total length (preserved) may thus approximate 150 to 200 mm. One of the collections (D5838) contains many tube

fragments, some with individuals. Most tubes are flaccid and depressed to cylindrical in cross section; some of the larger ones are about 100 mm long and 6 mm wide. Since the tubes are fragile and easily broken, the total length is probably considerably more than 10 cm.

The body is depressed to cylindrical in cross section. An anterior region of 20 to 25 segments is more or less sharply set off from segments farther back; its rings are both shorter and wider, and its parapodia more fully developed than those farther back. Most individuals have lost the long, paired palpi but some retain longer or shorter portions of these structures, in their normal attachment, at the sides of the prostomial caruncle (Fig. 1, a).

The body consists of three regions, (1) an anterior one of about 20 to 25 segments in which parapodia are biramous (except the second segment which is uniramous), (2) a median region of 70 or more segments in which parapodia are uniramous, and (3) a posterior region of 90 or fewer segments in which they are again biramous. The change from anterior to median regions, is transitional in that notopodia come to be gradually smaller and disappear as small papillae. The change from median to posterior regions is also gradual; notopodia again appear gradually, although they never come to be as large. The total number of segments may thus be 150 to 200, consisting of 20 to 25 anterior, 70 or more median, and 90 or fewer posterior, ones. An accurate count is not possible because it is difficult to estimate exact levels where specimens are broken.

The presence of a third body region for species of *Disoma* was first recorded by Levisen (1882, p. 129), for which he erected *Trochochaeta sarsi*; Michaelsen (1897, p. 41) showed it to be the posterior end of *Disoma multisetosum* Oersted.

The prostomium is an elongate, flat ridge, narrowed and rounded at its anterior margin when the proboscis is retracted, or somewhat weakly trilobed when the proboscis is everted. It widens just in front of the palpal attachment but narrows again farther back and is continued behind the palpal bases as a narrow caruncle, such as characterizes species of *Poecilochaetus* Claparède. Normally the prostomium is directed downward at its anterior end; thus it is seen with difficulty in dorsal view, and fully

only in frontal view. There are three or four inconspicuous eye spots at the sides of the prostomium, between the palpal bases. They are small in size, more or less deeply embedded and easily overlooked.

The palpi are probably long in life and ca-

pable of great extension. Preserved, they are greatly shrunk and fallen from most individuals. As in members of the family Spionidae, they are nearly cylindrical processes and have a deep, longitudinal groove along one side, facing the mouth; they have dark pigment

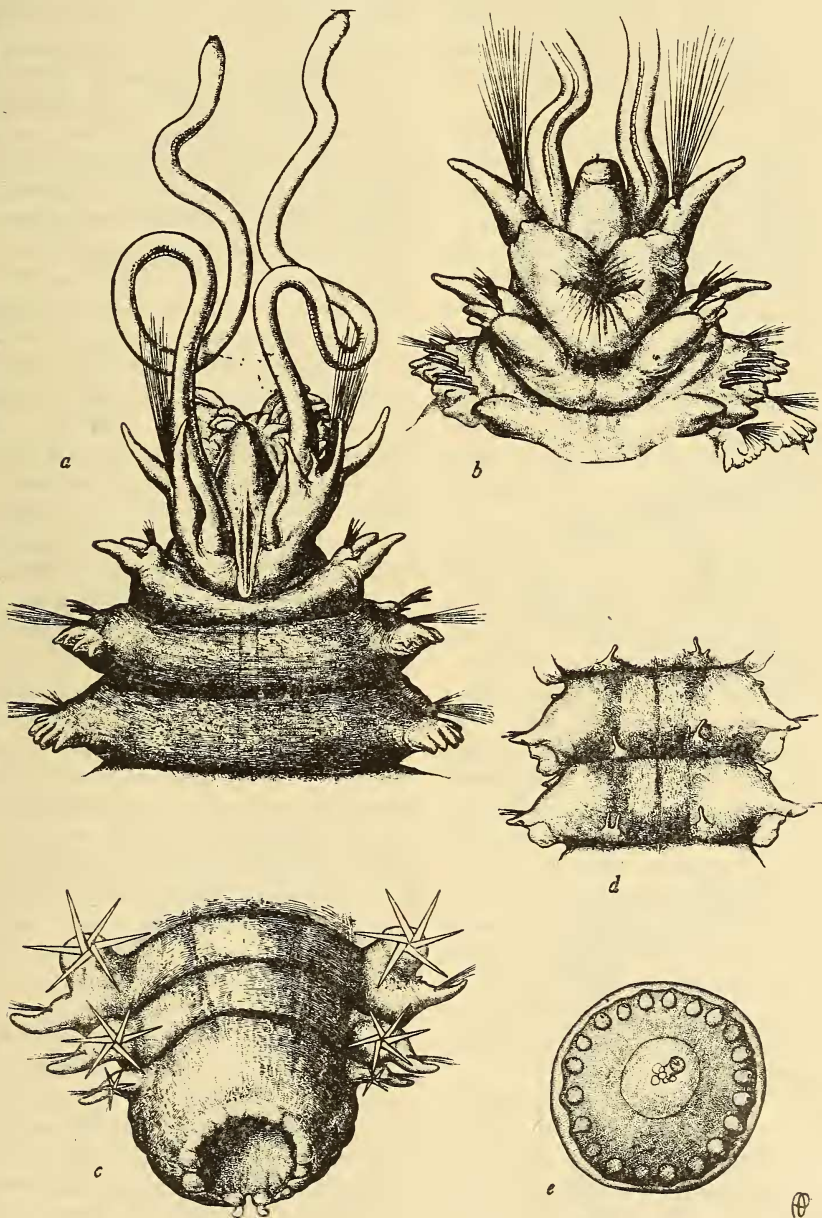


FIG. 1.—*Disoma franciscanum*, n. sp.: a, Anterior end including first four segments, with proboscis partly everted, in dorsal view, $\times 50$; b, anterior end including first three segments, distal ends of palpi not shown, in ventral view, $\times 50$; c, posterior end including pygidium and last three segments, in dorsal view, $\times 110$; d, two segments from posterior region of body, in ventral view, $\times 46$; e, ovum from body cavity, seen in optical section through the long axis, $\times 600$.

along the sides of the groove. When fallen away, they leave a long, oval scar of attachment at the sides of the prostomial ridge.

The mouth is a large, triangular area on the ventral side of the first segment. When the proboscis is retracted, the anterior and posterior edges of the mouth are strongly ridged (Fig. 1, *b*) and indicate capability of great extension. When the proboscis is extended, the mouth is widely open to permit protrusion of a large proboscis.

The proboscis is a voluminous, thin-walled, much-branched sac, approximately divisible into right and left halves; each half is again divided into short, digitate lobes, the branching largely dichotomous so that each side comes to have 16 to 20 short lobes. When everted, the proboscis covers the lower side of the anterior end of the body. When retracted, it occupies most of the body space in the first four segments. Thereafter, the alimentary tract is slender through 17 segments, except for paired diverticula in each segment; these paired pouches number one set to each segment and are ventrolateral in attachment.

The first segment is biramous and larger in its postsetal lobes than those farther back. It is directed forward so that its setae extend far in front of the prostomium. The notopodial, postsetal portion is a long lobe that is entire, bifid or even trifid at its free end (this character seems to have no significance since those of a single individual frequently differ from each other as shown in Fig. 1, *a*). The neuropodial, postsetal portion is similarly variable or asymmetrical, but usually entire. The setal lobes are short and papillar; they lie immediately in front of the proximal bases of the postsetal lobes. The notosetal fascicle is much smaller than the neurosetal one and its setae shorter and fewer. All setae in the first segment are long, pointed and straight; each fascicle is supported by a single, slender aciculum that is completely embedded.

The second segment (Fig. 2, *b*) is uniramous and its setae are also directed forward but not nearly so far as those of the first one. It is provided with an elongate, triangular, notopodial, postsetal lobe; this may be entire or slightly serrated to form two or three shorter lobes. There is considerable irregularity and asymmetry in this respect, just as for the postsetal lobes of the first segment. There is no

notopodial fascicle or papilla (or even notopodium). The setigerous lobe is an elongated ridge and provided with four or five projecting, dark-yellow spines (actually the emergent acicula), alternating with, but in front of, five slender, longer, pointed setae. In addition, there are two or three partly developed, dusky embedded acicula at the superior edge of its respective fascicle. This parapodium is somewhat ventral in position as compared with those in front and behind. The heavy spines of this and the next parapodium are probably homologous with the penicillate acicula farther back, and with the single, projecting acicula in parapodia of median and posterior body regions, although they resemble setae in their distal extension. The second and third neuropodia have no other embedded structure.

The third segment (Fig. 2, *c*) is at once distinguishable because of the heavy, dark brown, projecting neuroacicular spines. Parapodia are biramous and project laterally. The notopodium consists of a broad, serrated postsetal lamella in which the upper portion is usually the largest; its setal fascicle consists of 20 to 25 slender, pointed notosetae that resemble those farther back. The neuropodium is much larger and glandular; it has a broad postsetal membrane that is crenulate to serrate at its distal edge. The neurosetal fascicle consists of four or five heavy, dark brown, slightly curved acicula (spines) in a vertical series, anterior to, and alternating with, a similar number of delicate, slender, pointed setae. In addition, there are two dark, partly developed acicula at the superior edge of the series (to be seen only by dissection). The arrangement and general appearance of these bristles is like that for the neuropodium of the second segment, but the acicula are heavier and darker and the setae slenderer and smaller. The inferiormost acicula are anterior to those going progressively upward; the uppermost is therefore posteriormost and the small, embedded, partially developed ones are deeply embedded in the fleshy part of the parapodium. Below the ventral edge of the third parapodium there is a low, thick, glandular pad somewhat resembling a ventral cirrus in its position; it is continued posteriorly on segments 4, 7, 8, and farther back as a diminishing papilla. There is no long cirrus on the third segment, such as is present in *Disoma multisetosum* Oersted.

The fourth segment (Fig. 2, *d*) is characterized for its greatly expanded, serrated, post-setal lobes in both notopodia and neuropodia; they are largest and longest above. The notopodial one has about 13 short distal serrations (or several accessory ones); the neuropodial one has about eight similar, or slightly smaller

serrations of which the inferiormost are slightly the larger. The notopodium is armed with 16 to 18 slender, pointed setae supported by a single, slender embedded aciculum. The neuropodium has about 16 similar setae and a single aciculum. The setae resemble those farther back.

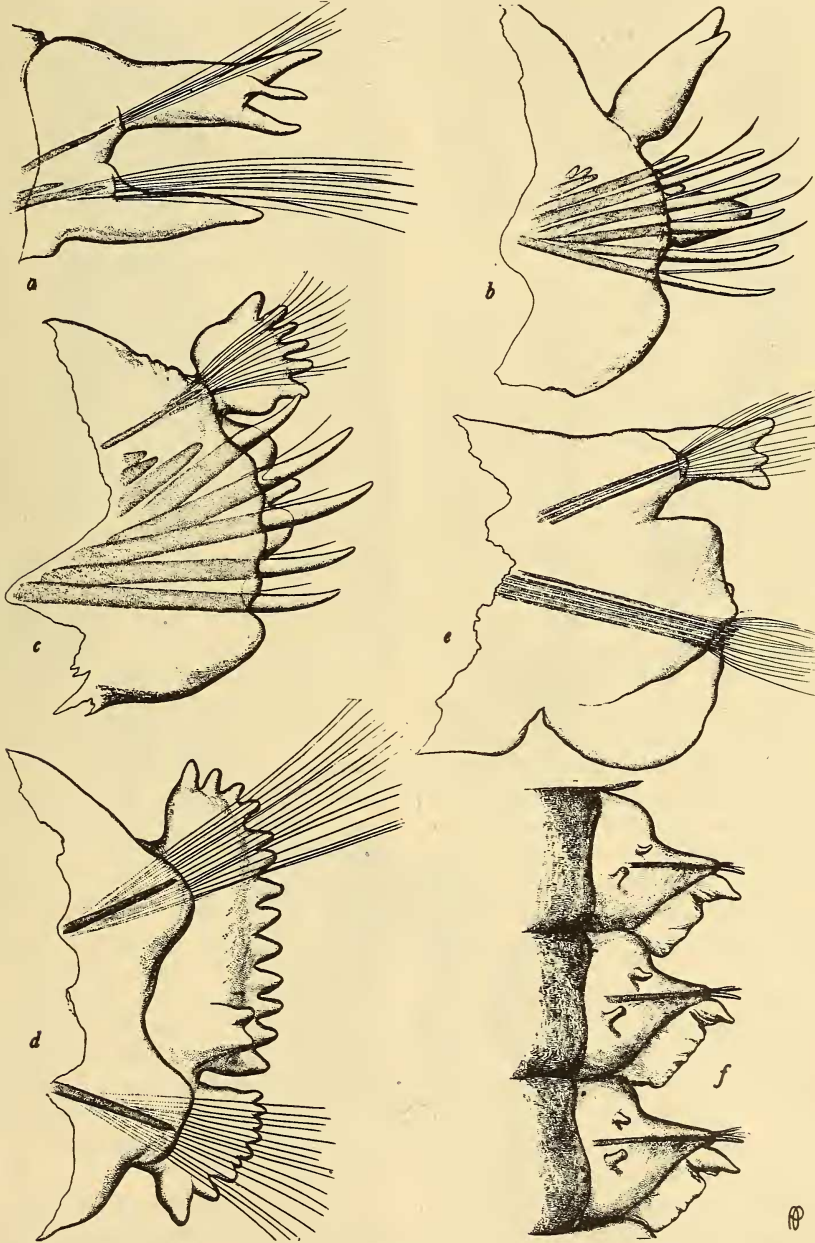


FIG. 2.—*Disoma franciscanum*, n. sp.: *a*, First parapodium in anterior view, $\times 88$; *b*, second parapodium in anterior view, $\times 112$; *c*, third parapodium in anterior view, $\times 112$; *d*, fourth parapodium in anterior view, $\times 125$; *e*, seventeenth parapodium in anterior view, $\times 112$; *f*, right half of three far posterior segments in dorsal view, $\times 56$.

The fifth segment resembles the fourth one but tends to have fewer serrations in its postsetal lobes. There are about nine in the notopodium (or up to six additional, weakly developed ones at the inferior end). Notopodial and neuropodial postsetal lobes are less unequal to each other than those in the fourth segment. The sixth and seventh segments resemble the fifth one but the postsetal lobes have about nine or ten serrations each. By the eighth segment there are only about seven serrations; the ninth and tenth segments have about six serrations in each lobe, the eleventh and twelfth parapodia may have only three or four serrations in each, and between segments 13 to 20 (Fig. 2, *e*) there may be only two to three lobes, or a single one.

Thereafter (i.e., from segment 20 to 25) the notopodium is absent; only neuropodia are developed through a long, median region. Through the anterior region, after the fifth segment, neuropodial postsetal lobes gradually come to exceed the diminishing notopodial, postsetal ones. They come to be deep, fleshy lobes, with both presetal and postsetal ridges well developed, but the latter are the larger and project collar-like behind the setal fascicle. Thus, at a segment near the end of the anterior region, the notopodial postsetal lobe is a narrow, compressed membrane behind the low, papillar, setal fascicle; the neuropodium is a deep, fleshy lobe with an entire, or weakly serrated, postsetal membrane and a short, entire, presetal membrane. Notosetae gradually diminish in size and number to their disappearance. Neurosetae come to form characteristic fascicles; there is a vertical series of preacicular and postacicular pointed setae; these are separated from one another by a similar vertical series of ten to 15 penicillate acicula (Fig. 3, *b*).

Distinct dorsal and ventral cirri are absent. What has been called dorsal cirrus is here interpreted as the postsetal, notopodial lobe, since its position is not dorsal to, but behind, the setal fascicle. The thick pads below the neuropodia in anterior segments are also construed to be glandular rather than ventral cirri. They may participate in secretion of fibers for tube construction, as has been suggested by Thulin (1921, p. 12).

Long, pointed simple setae are present in all notopodia and neuropodia, but those in the

second neuropodium are greatly reduced. Acicula are present in all parapodia and some are modified for special uses. Those in the first segment are slender and embedded as are also those in notopodia farther back. Those in the second and third neuropodia are greatly developed and emergent; those in neuropodia of segments farther back come to be penicillate and emergent, functioning probably in tube-construction. The notopodial armature of the posterior region is also acicular, but probably functions for grasping.

The middle region of the body is characterized for lacking notopodia; its segments come to be longer than those in front. The neuropodium consists of a simple, conical papilla; this is armed with a single, heavy, projecting aciculum and a slender tuft of long, pointed setae that resemble those in front. This arrangement is continued through 70 or more segments. A podal membrane is gradually developed; it has its origin immediately behind the neuropodium and extends horizontally back so that it comes to occupy much of the space to the next septum. It comes to be thin and expanded, with frilled margins. These segmental membranes are a conspicuous feature through long median and posterior (Fig. 2, *f*) regions and are continued posteriorly to the end of the body. They recall the parapodial pouches of *Laonice* among the Spionidae, and are similarly found in the region where ova occur.

The transition from middle, uniramous, to posterior, biramous regions of the body is gradual, and marked only by the appearance of small, papillar notopodia, located a short distance above, and within, the neuropodia. Notopodia are low mounds, armed with a close fascicle of four to seven yellow acicula; when retracted they are completely embedded and invisible except for their distal tips. When the neuropodium is extended, the acicula are pushed up and out so that they form stellate structures (Fig. 1, *c*); they are not accompanied by setae. These notopodial spines may function for traction. Neuropodia in this region resemble those in the middle region of the body but are successively smaller.

On the ventral side of the body, at about segment 40 to 44, minute, paired ventral papillae make their appearance, immediately within the line forming the proximal portion of the neuropodia. They gradually develop to form

slender, short filaments and come to be most conspicuous in the posterior region (Fig. 1, *d*) where they consist of one to three filaments on a side; they arise from a low mound. These structures were first described by Levisen (1882) and called branchiae. Michaelsen

(1897, p. 41) showed that they are retractile; he recorded their presence for *D. multisetosum* Oersted from about the twentieth segment. Eisig (1914, p. 536) concluded that, morphologically, they are not branchiae since they have their origin away from the notopodium,

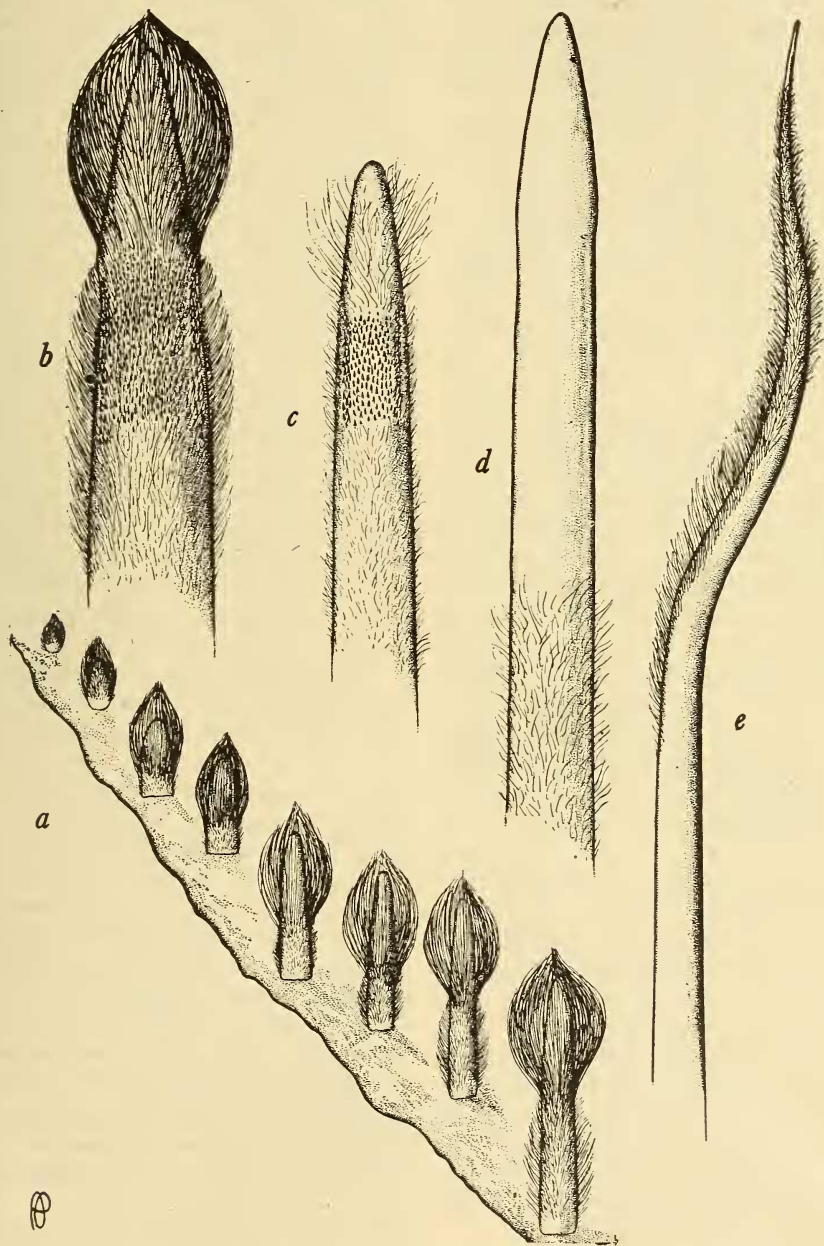


FIG. 3.—*Disoma franciscanum*, n. sp.: *a*, Embedded series of penicillate acicula from seventeenth thoracic neuropodium, showing successive stages in development, $\times 940$; *b*, distal end of developed penicillate aciculum, $\times 1160$; *c*, distal end of emerged penicillate aciculum, with brush partly worn away, $\times 780$; *d*, worn penicillate aciculum from inferior part of fascicle, $\times 658$; *e*, thoracic neuroseta showing fringe at distal end, $\times 940$.

but that they more nearly resemble the lymph branchiae of some capitellids and glycerids. From their position and structure, however, it might be suggested that they function in sensory reception, since parapodia of their respective segments are unusually simple and have few or no lobes for this purpose.

Setae are entirely simple and differ little among themselves except for relative thickness, length and amount of pubescence, if any. Those in the first segment are long, slender, smooth, and nearly straight (Fig. 1, *b*). Farther back they are shorter though still slender and straight. From about the fourth segment they come to be somewhat geniculate and the distal end is covered with a delicate, long pubescence that is irregularly dispersed (Fig. 3, *e*). This hairiness is particularly marked on neurosetae in anterior segments beginning from the fifth one.

Acicula are variously modified. Those of the first segment are slender and embedded. In the second and third neuropodia they are increasingly heavier though still smooth; they are distally somewhat curved and project a considerable distance from the fleshy part of the podium. From the fifth segment the acicula are penicillate (Fig. 3, *a-d*). They are arranged in a vertical series between the setae, with the distal and proximal portions covered with an outer, pubescent sheath. When fully formed, the distal end with its hairs resembles, in shape, the flame of a candle; the subdistal portion of the shaft is slightly rectangular in cross section, with longitudinal rows of spines at the angles, and the proximal portion is covered with pubescence. As the aciculum emerges from the lobe, the distal brush is spread apart, the smooth rod emerges and the pubescence is gradually lost. Various stages (Fig. 3, *a*) of these developing acicula can be found in the superiormost part of the neuropodium, in all segments of the anterior body region, from the fifth one. The embedded fascicle is spiralled and may contain 20 chestnut-colored acicula in various stages of development. Thulin (1921, p. 12) called these acicula "lanzenformige Pinselborsten" and suggested that they function in tube construction.

The body tapers abruptly toward the posterior end and terminates in a thick, collar-like pygidium (Fig. 1, *c*) with a large, circular anal aperture; the ventral edge of the collar is

incised and provided with a pair of subspherical, tiny processes which lie proximal to each other, in a transverse direction.

In some individuals ova are present in great number, in the hinder median and posterior segments of the body; in some instances they are believed to be nearly mature. They are flat, lens-shaped, circular or nearly so. The surface is smooth and covered with a thick membrane; beneath the surface there is a circle of flask-shaped vesicles, numbering 21 to 29 in each ovum; these vesicles are clear and have their narrowed end directed toward the egg membrane (Fig. 1, *e*). Near the center there is a large germinal vesicle or nucleus. The entire structure resembles that of *Poecilochaetus serpens* Allen (1904, pl. 12, fig. 64) and some spionids (Hartman, 1941, pl. 46, fig. 19).

Segmental organs (nephridia) are perhaps present on most segments but they have not been definitely distinguished on anterior segments. They are clearly visible on median and posterior segments as small, paired papillae, each located near the anterodorsal edge of neuropodia (Fig. 2, *f*); they are only slightly visible in ventral view. In the anterior part of the third body region, they resemble the gradually developing notopodia, but their position is in front of, not above, the neuropodium.

The alimentary tract is a straight tube and has few modifications. The mouth leads into the large, voluminous proboscis; this occupies most of the space in the first four segments (when retracted). This is followed by a long, slender, cylindrical esophagus that extends distally through the next eleven segments; it has paired, thin walled, ventrolateral pouches, one pair to each segment. The esophagus gives rise to the gradually widening thin walled intestine farther back. The intestine is usually filled with fine, granular materials, perhaps sand, shell and other inert materials, from which the organic foods may be sifted.

The tube of *Disoma franciscanum* is long and cylindrical to somewhat flattened. It tapers slightly to a constricted aperture at the forward end. Its walls consist of finely compacted, rust-colored mud; its inner walls are smooth but there is no membranous lining. The tubes are easily broken lengthwise or crosswise. There is no indication of anastomosing which Thulin (1921, p. 11) described for *D. multisetosum* Oersted.

According to Thulin (loc. cit.) the tube materials are held together by longitudinally arranged fibrils that are secreted from spinning glands, probably located in an anterior portion of the body. This author suggests that the process may be likened to that in some species of *Panthalis* (family Polyodontidae) described by Watson, where the fibrils are formed by certain spinning glands and spread out with the aid of penicillate bristles which carry the fibrils out to the walls of the tube, aided by the movement of other setae.

D. franciscanum resembles *D. multisetosum* Oersted in some respects, especially in having serrated postsetal lobes in anterior parapodia. It differs sharply, however, in that there is no long cirrus on the third parapodium. The former is provided with heavy projecting acicula in both the second and third parapodia but those of the third are by far the heavier. Segments of the middle body region are uniramous. Neuropodia of middle and posterior body regions are provided with a horizontal, lamellar membrane that comes to be pouchlike. Ventral papillae are present from about the fortieth segment and continued posteriorly to the end; they number usually one or two filaments to a segment, on each side.

Holotype.—U.S.N.M. no. 20912.

Type locality.—San Francisco Bay, Calif.

Distribution.—San Francisco Bay, Calif., in 1 to 16 fathoms, associated with sand, mud, and shale.

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